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Serial No. 10/736,354
Response to Official Action

In the Drawings

There are no amendments to the drawings.

Remarks

Applicant has amended the specification as page 5, first full paragraph to include that "layers of 3 mm or less have been found to be advantageous", which should address the Examiner's rejection of claim 4. Applicant respectfully submits that no new matter has been added as this was disclosed in the original specification at page 24, lines 17-18 (e.g. claim 4 as originally filed).

Applicant has cancelled claims 34 and 35 and has amended claims 1, 6, 25, 30 and 31 to address the Examiners 35 USC 112 rejections and 37 CFR 1.83(a) objections. Applicant respectfully submits with regard to claim 15, the term "a segment" is recited in the first line of claim 15 and therefore reference to "the segment" recited in line three is proper.

Claim 1 recites "at least one wire extending from said first link member to said second link member controlling the movement of said first and second link members, said at least one wire including a preload so as to maintain said link assembly under tension" and an "elastomer is disposed between . . . the first and second link members whereby the layer is maintained under compression by said at least one wire such that a bending movement between the members produces shear movement within the elastomer and substantially no compressive movement as a result of the relative movement between the said first and said second members."

In addition, Claim 36 recites "at least one wire extending from said first link member to said third link member controlling the movement of said first and third link members, said at least one wire including a preload so as to maintain said link assembly under compression" and "said elastomeric material maintained under tension or compression by said at least one wire such that substantially no compressive deformation of said elastomeric material occurs during rotation of said third link about the point of rotation relative to said first link."

35 USC 103(a) Rejections

The Examiner has submitted that while U.S. Patent No. 3,266,059 ("Stelle") "does not disclose a resilient elastomer", that U.S. Patent No. 5,902,050 ("Balczun") "teaches a resilient elastomer (plastic) bearing . . . disposed between two members . . . and the elastomer is . . . sufficiently thin and maintained under compression . . . for the purpose of providing isolation of transmitted vibrations." (Official Action 7/17/06, p. 5.) The Examiner further submits that it "would have been obvious to . . . modify the teachings of Stelle and provide a resilient elastomer bearing disposed between two members . . . as taught by Balczun, for the purpose of providing isolation of transmitted vibrations." (Official Action 7/17/06, pp. 5-6.)

Applicant notes that Stelle teaches that the "compressive forces of the balance springs 120 cooperate with the tension spring 100 . . . to prestress the flexible joint in a first position." (Col. 4, Ins. 42-45.) Therefore the compressive force of Stelle is created

by the balance springs and the tension springs. If one were to combine the teachings of Stelle and Balczun, one would arrive at a arm assembly with a first and second link members having springs located therebetween and a compressed elastomer to prevent transmission of vibrations. It is highly questionable whether this combined system could function. Either the springs would be completely compressed not allowing the arm to effectively rotate or the joints would be relatively loose not preventing the transmission of vibrations. MPEP 2143.01; *In re Gordon*, 733 F.2d 900, 221 USPQ2d 1125 (Fed. Cir. 1984) (It is well settled that if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.)

Applicant respectfully submits that a primary teaching of Stelle is that the pre-stressing of the joints is achieved by the combination of the tension spring 100 and the balance springs 120 and there is no suggestion in either Stelle or Balczun to abandon this teaching. (Col. 4, Ins. 11-23 & 37-46; FIG. 6.) It is well settled that the mere fact that references can be combined or modified does not render the resultant modification obvious unless the prior art also suggests the desirability of the modification. *See, e.g.*, MPEP 2143.01 ("The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination."); *In re Mills*, 916 F.2d 680, 682, 16 USPQ2d 1430, 1432 (Fed. Cir. 1990) (fact that prior art "may be capable of being modified to run the way the apparatus is claimed, there must be some suggestion or motivation in the reference to

do so.”). In the present case, Applicant respectfully submits that, as noted by the Examiner, the purpose of the elastomer in Balczun is to provide isolation of transmitted vibrations or movement. However, the elastomer as recited in claims 1 and 36 provides for “rotation of said third link about the point of rotation relative to said first link.” Therefore, Balczun actually teaches away from use in a mechanical arm as it is provided to reduce movement rather than transmit movement. Nowhere does Balczun teach, disclose or suggest that the elastomer can or may facilitate movement between the members it is positioned between, but rather teaches the exact opposite.

Accordingly, Applicant respectfully submits that because neither Stelle nor Balczun teach, disclose or suggest the invention as claimed in either claim 1 or 36, but rather teach away from such a combination, a rejection based on a combination of these two references is inappropriate.

In addition, Applicant respectfully submits that the two surfaces in the snake arm according to the present invention both have to move in a mathematically defined way in order for the snake arm to be controllable. This is done by compressing the joints so the rubber is compressed and therefore it can only shear when movements are applied by means of the wires. This is not contemplated or fairly suggested in Balczun as this reference is directed toward a system for minimizing movements between members. *In re Arkley*, 455 F.2d 586, 587-88, 172 U.S.P.Q. 524, 526 (C.C.P.A. 1972) (when considering a reference, the reference must be considered for its teachings as a whole and

it is inappropriate to pick and choose various elements from the references without regard to what the references teach as a whole.)

With regard to U.S. Patent No. 5,297,874 ("Raines") the Examiner has submitted that Raines teaches "a bearing surface, and bearing surfaces are ubiquitous to most mechanical devices, therefore to utilize its teaching within Stelle is obvious and proper" and that "Raines also discloses that elastomeric bearings are known for being used between annular elements." (Official Action 7/17/06, p. 14.)

First, if one were to combine the "heavy duty elastomeric bearing" of Raines with Stelle, one would not arrive at the presently claimed invention. Rather, one would arrive at a robot arm having first and second members with springs located therebetween and a "heavy duty elastomeric bearing" positioned between the members to "protect the links from overstress due to outside stimuli." (Official Action 3/23/06, p. 2.) It is well settled that if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. MPEP 2143.01; *In re Gordon*, 733 F.2d 900, 221 USPQ2d 1125 (Fed. Cir. 1984). In the present case, Applicant respectfully submits that the elastomer layer cited in claims 1 and 36 facilitates movement of the robotic arm. There is absolutely no teaching in Raines that the "elastomeric bearing" may be used for facilitating defined movement. *In re Arkley*, 455 F.2d 586, 587-88, 172 U.S.P.Q. 524, 526 (C.C.P.A. 1972) (it is inappropriate to pick and choose various elements from the references without regard to what the references teach as a whole.)

The Examiner has stated that motivation for the combination of Stelle and Raines "has been provided" namely to "protect the links from overstress due to outside stimuli." However, there is absolutely no reason to protect the robotic arm from "overstress." Raines teaches use of a "heavy duty elastomeric bearing" for use in the construction of, for example, "the construction of underwater oil well pipelines connecting to a floating structure" so as to "accommodate the effect of movement of a floating platform relative to the sea bed without undue strain on interconnecting pipework." (Abstract; Col. 1, lines 12-17.) Raines further teaches that the invention may be used for "heavy duty elastomeric bearing . . . in relation to tether lines for mooring floating platform structure." (Col. 1, lines 18-20.) Raines does not fairly teach or suggest that the elastomeric bearing may be used in a delicate robotic arm between two surfaces that move in a mathematically defined way such that the snake arm is controllable.

Applicant submits that the combination of the springs of Stelle with the heavy duty elastomeric bearing of Raines would not result in a device that functions. In addition, there is not suggestion or teaching in either reference that the springs of Stelle should be discarded in favor of the elastomeric bearing of Raines. Even if one were to replace the springs with the elastomeric bearing, there is no teaching in Raines that the elastomeric bearing could be manipulated to facilitate the movement of the robotic arm according to claims 1 and 36. Accordingly, Applicant respectfully submits that combination of Stelle and Raines as suggested is inappropriate.

It is respectfully submitted that claims 1-2, 4, 6-13, 15, 17-26, 28-33 and 36, all of the claims remaining in the application, are in order for allowance and early notice to that effect is respectfully requested.

Respectfully submitted,

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